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Murzanski

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(54) **CLEANABLE KEYBOARD**

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(22) Filed: **Sep. 27, 2005**

(51) **Int. Cl.**
H01H 9/04 (2006.01)

(52) **U.S. Cl.** **200/302.1**; 200/302.2; 200/341; 400/472; 400/490

(58) **Field of Classification Search** ..... 200/302.1, 200/302.2, 5 A, 5 R, 341; 400/472, 490, 400/495, 496
See application file for complete search history.

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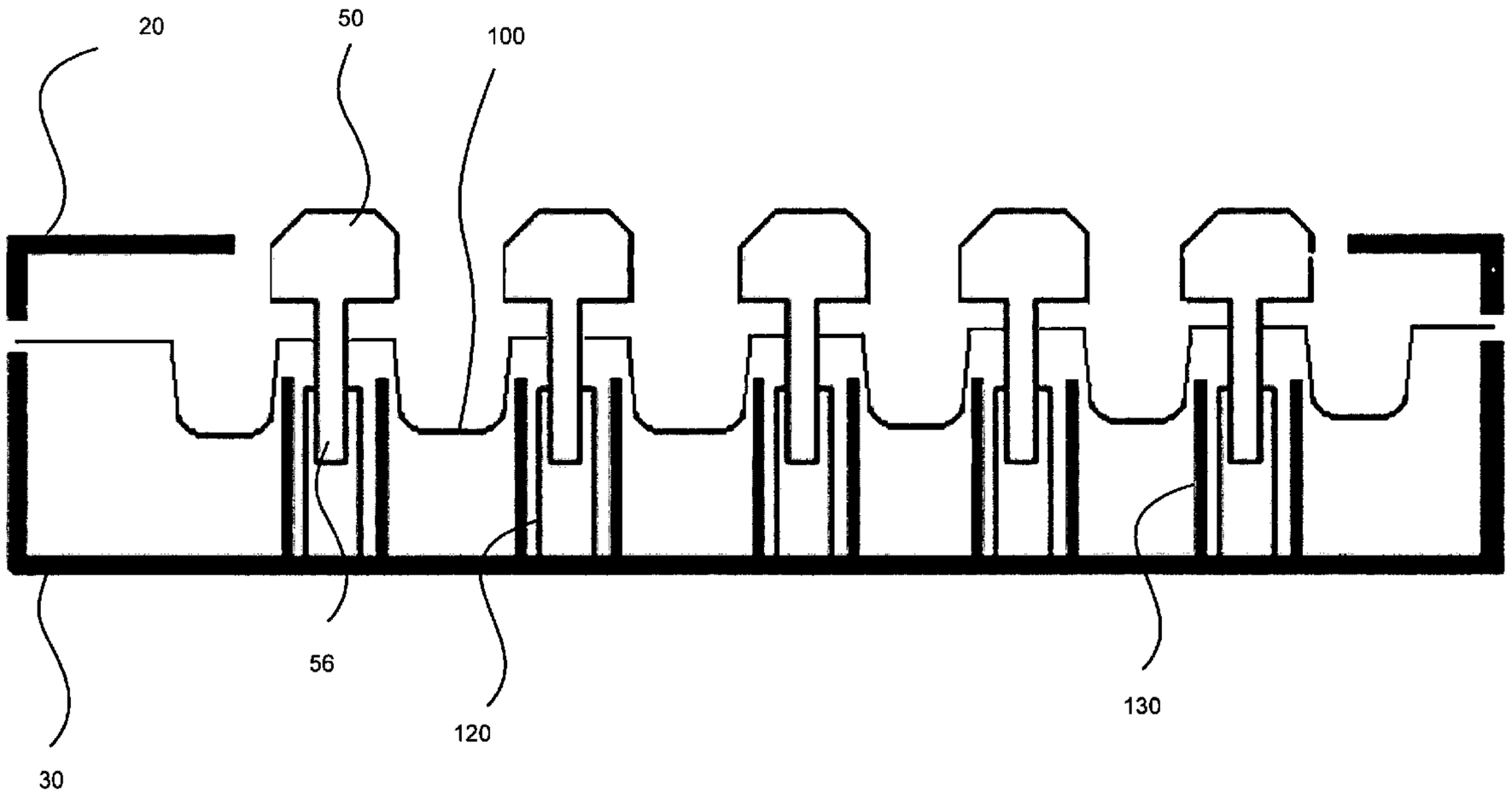
(57) **ABSTRACT**

In an embodiment, a keyboard includes a barrier layer. The barrier layer may be mounted between an upper and lower housing portion of the keyboard so as to provide a substantially water impermeable pocket about a keyboard circuit. The barrier layer includes at least one key aperture that allows the barrier layer to attach to a key, the attachment providing a substantially water impermeable seal between the barrier layer and the key. Thus, the barrier layer acts to prevent liquids that are spilled on the keys from contacting and damage an electrical keyboard circuit provided below the barrier layer. In an embodiment the keyboard may be rinsed under running water without damaging the keyboard circuit.

20 Claims, 11 Drawing Sheets



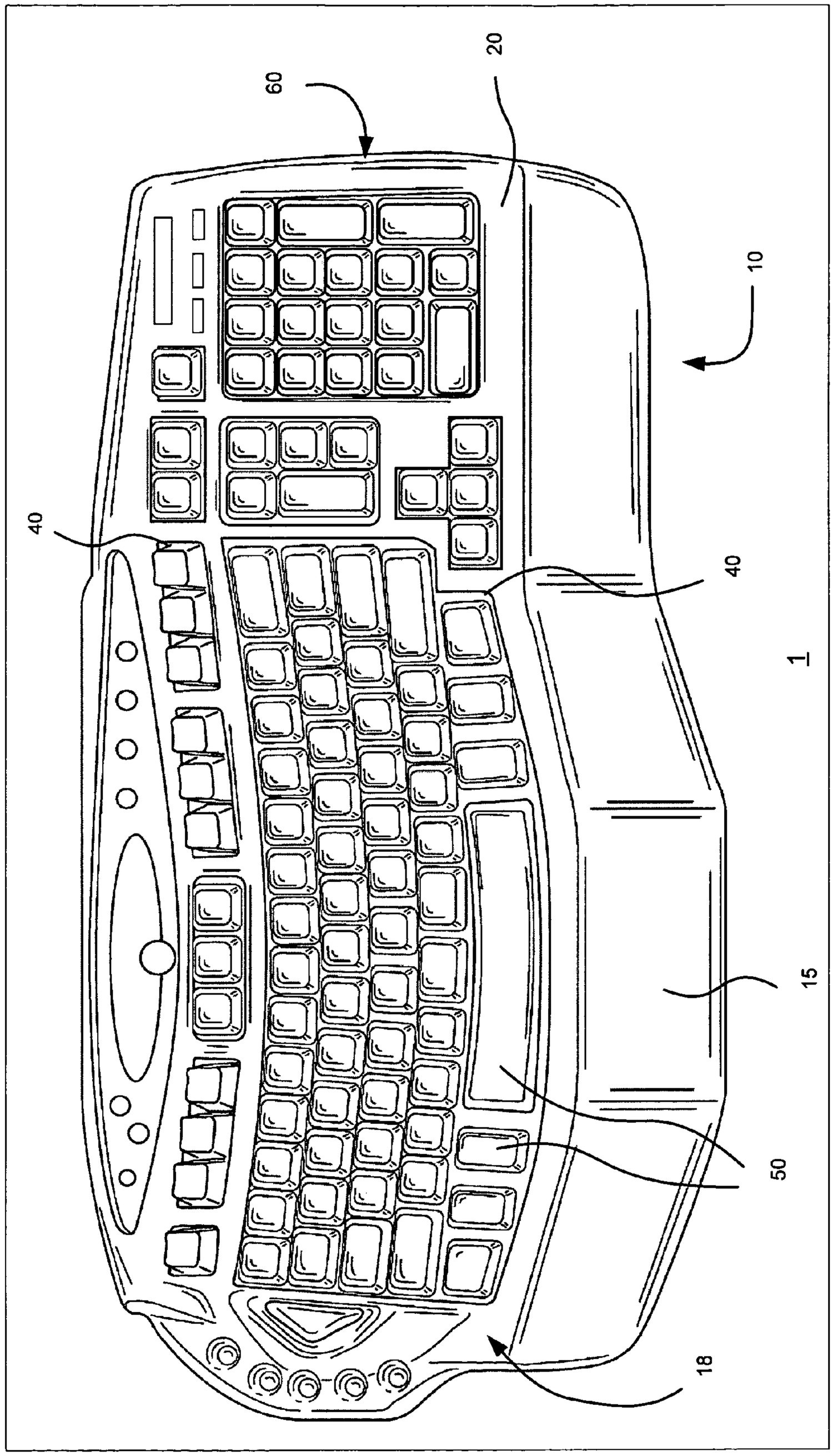


Fig. 1

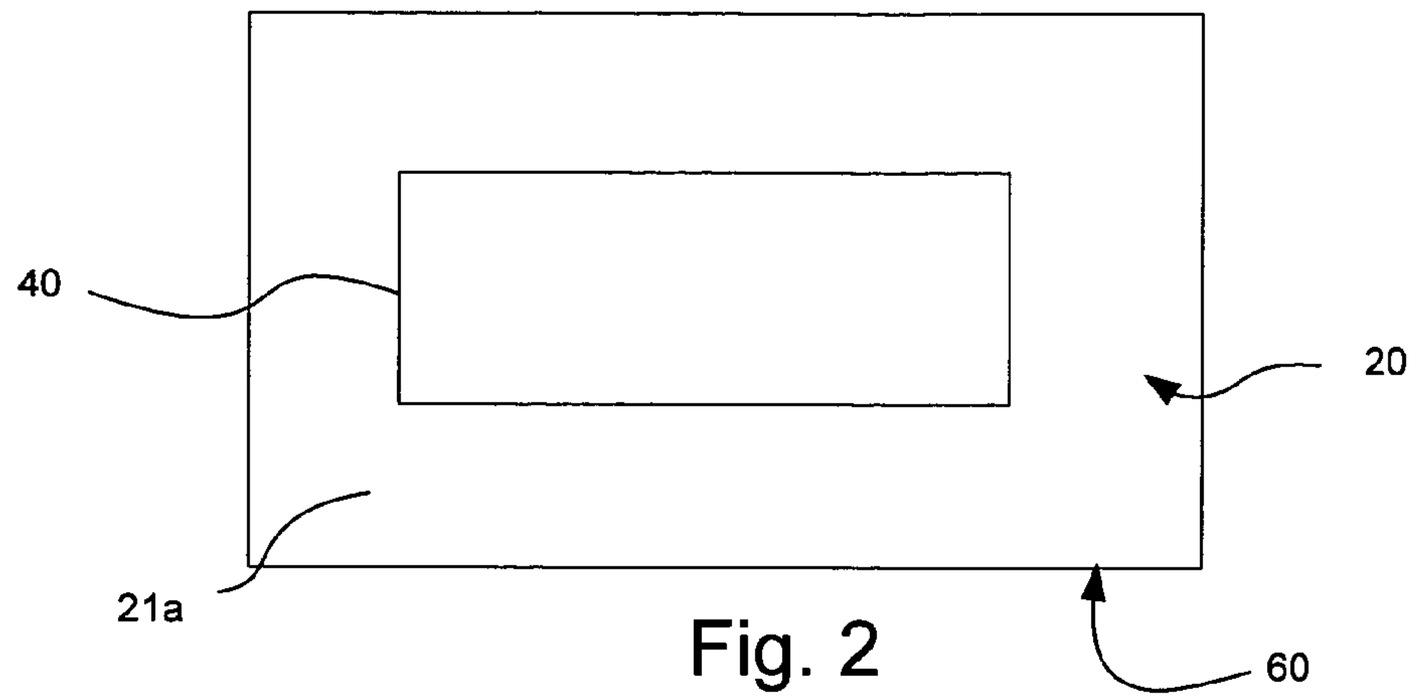


Fig. 2

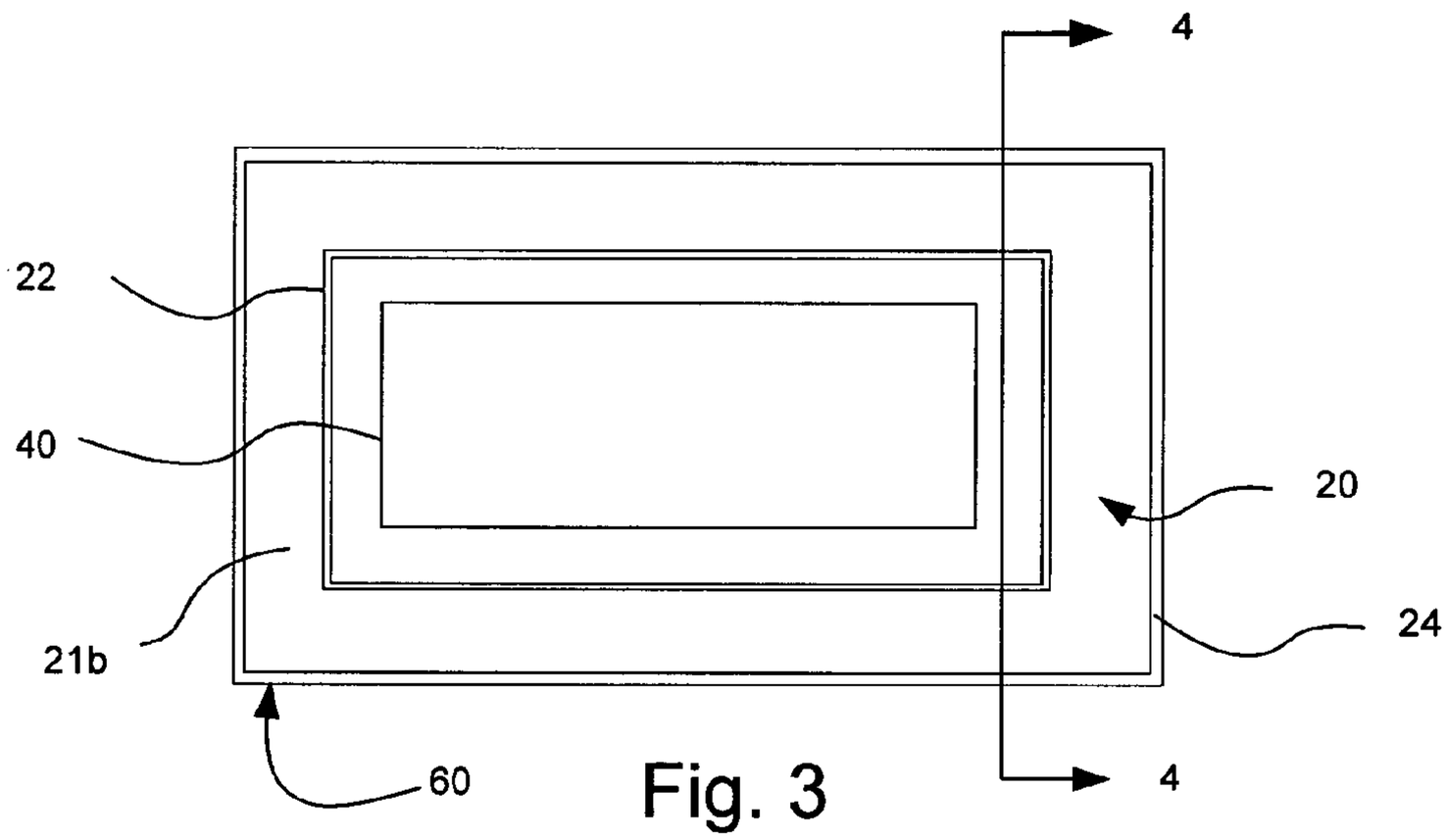


Fig. 3

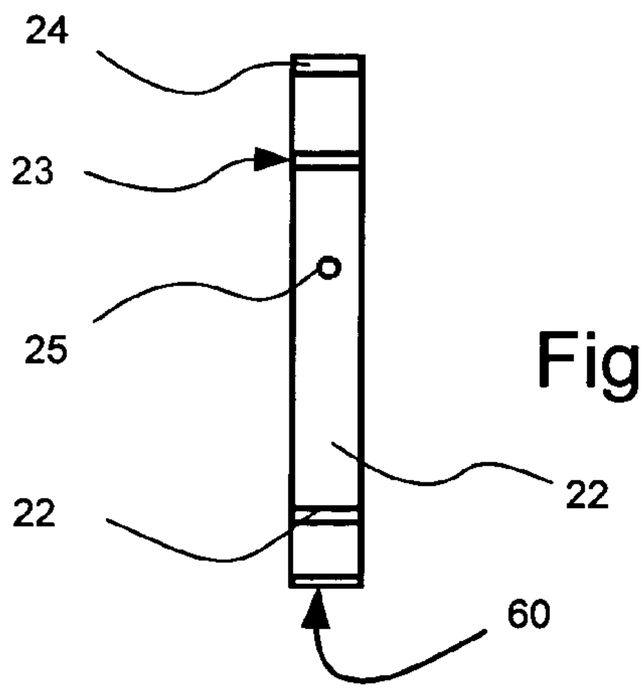


Fig. 4

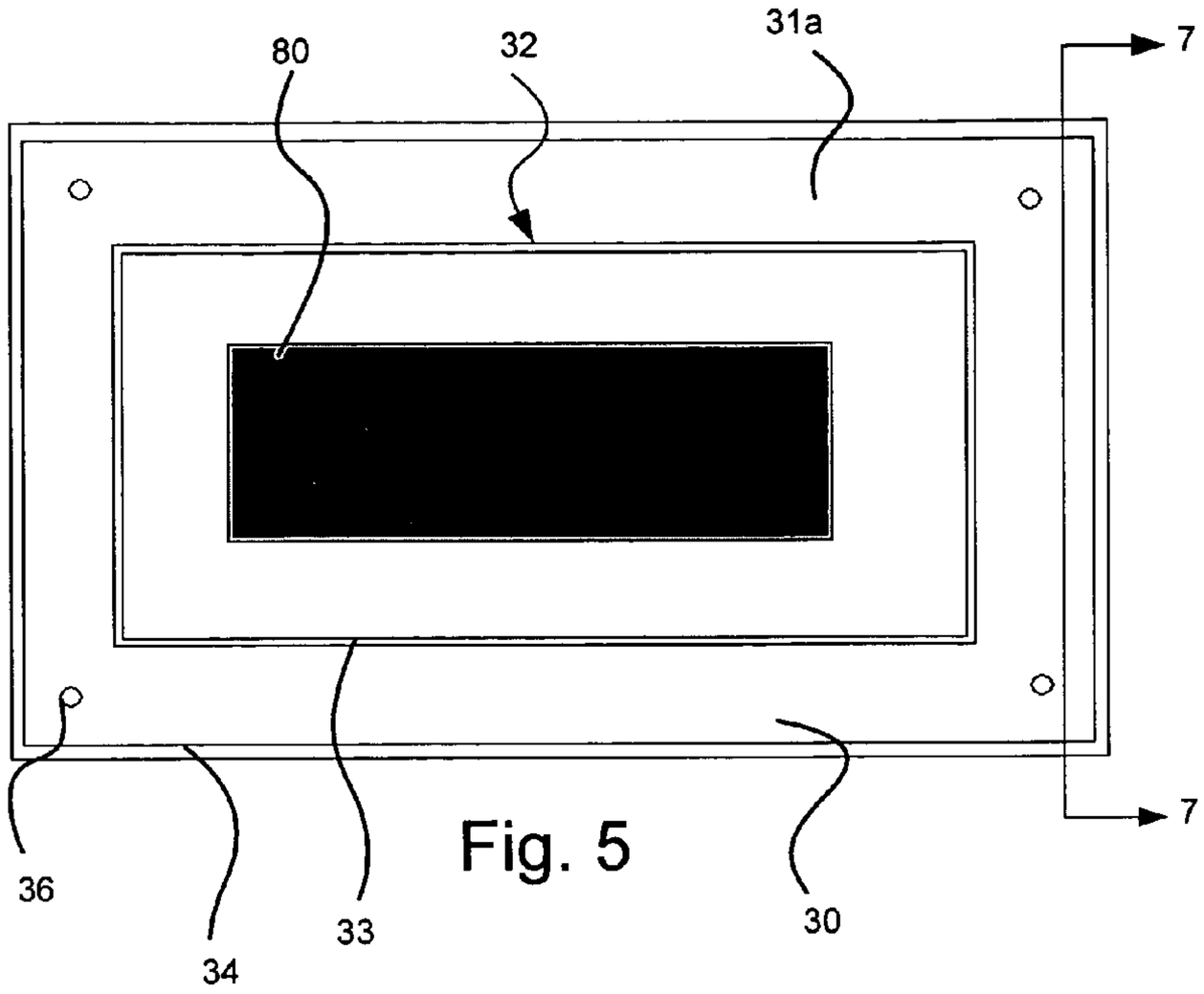


Fig. 5

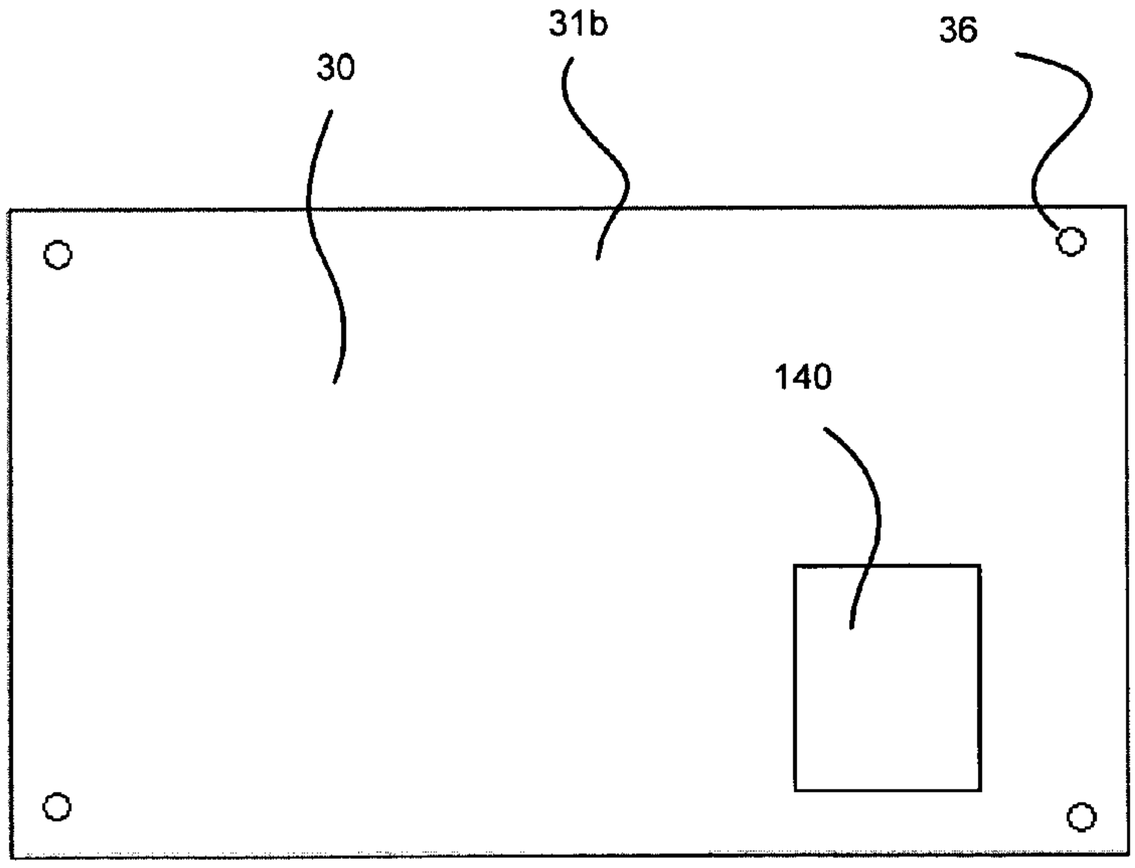


Fig. 6

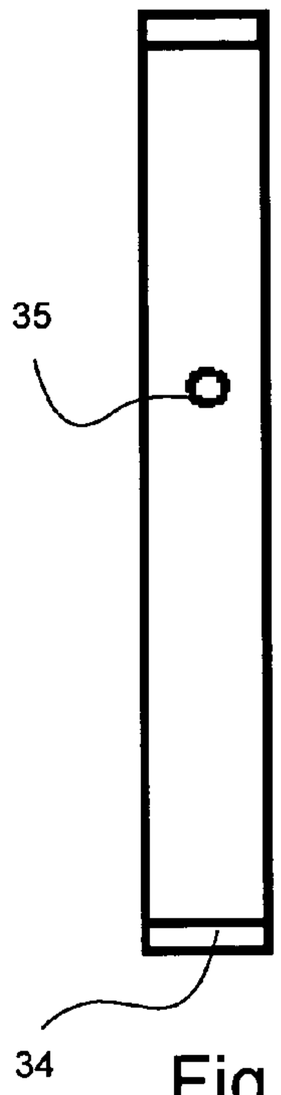


Fig. 7

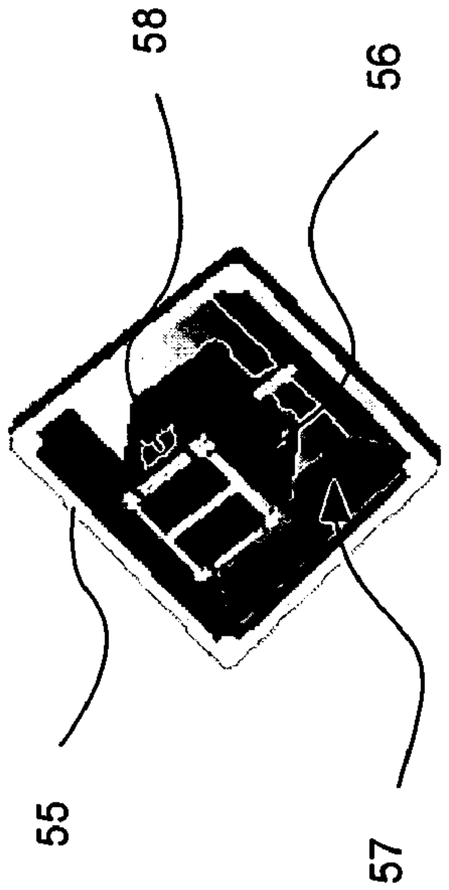


Fig. 11

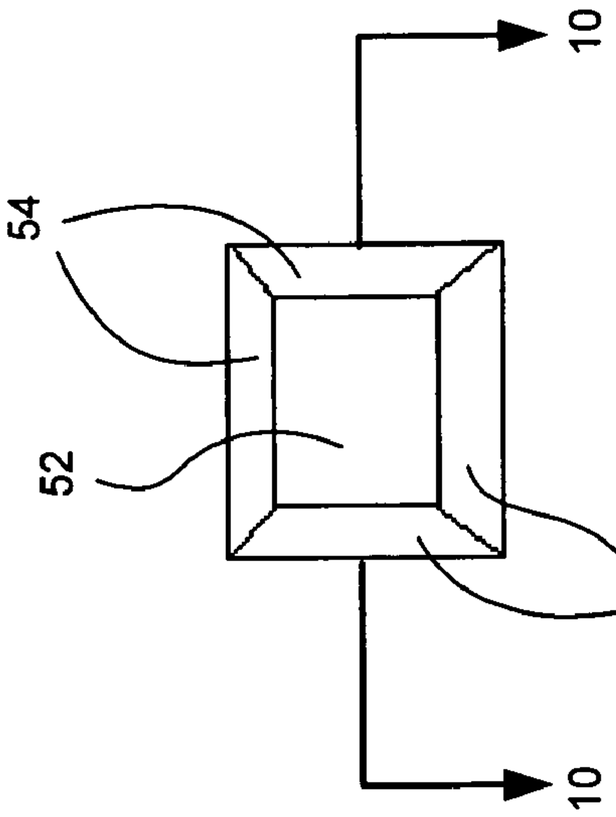


Fig. 9

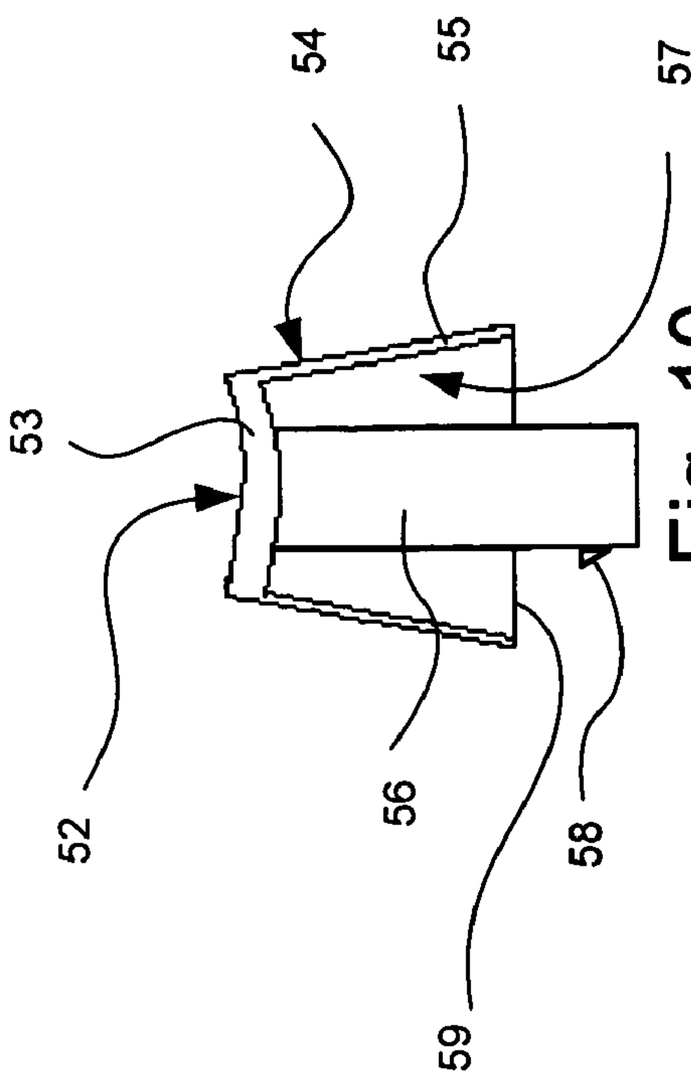


Fig. 10

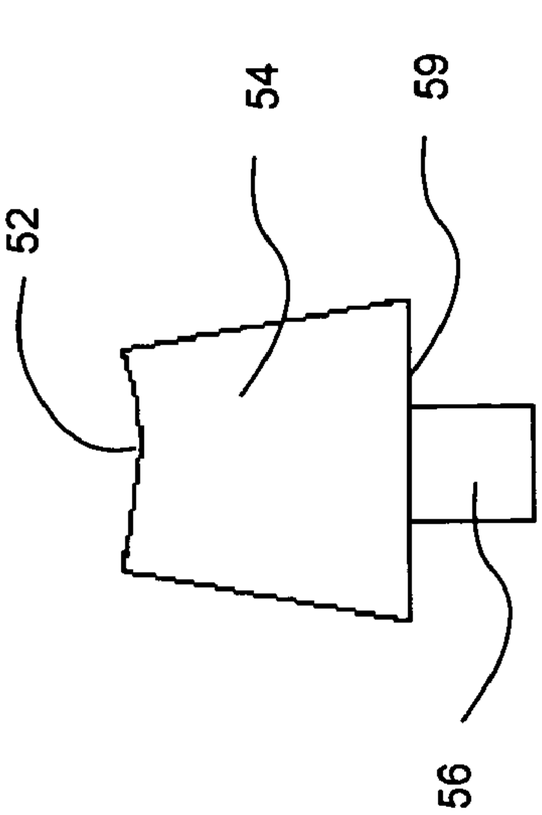


Fig. 8

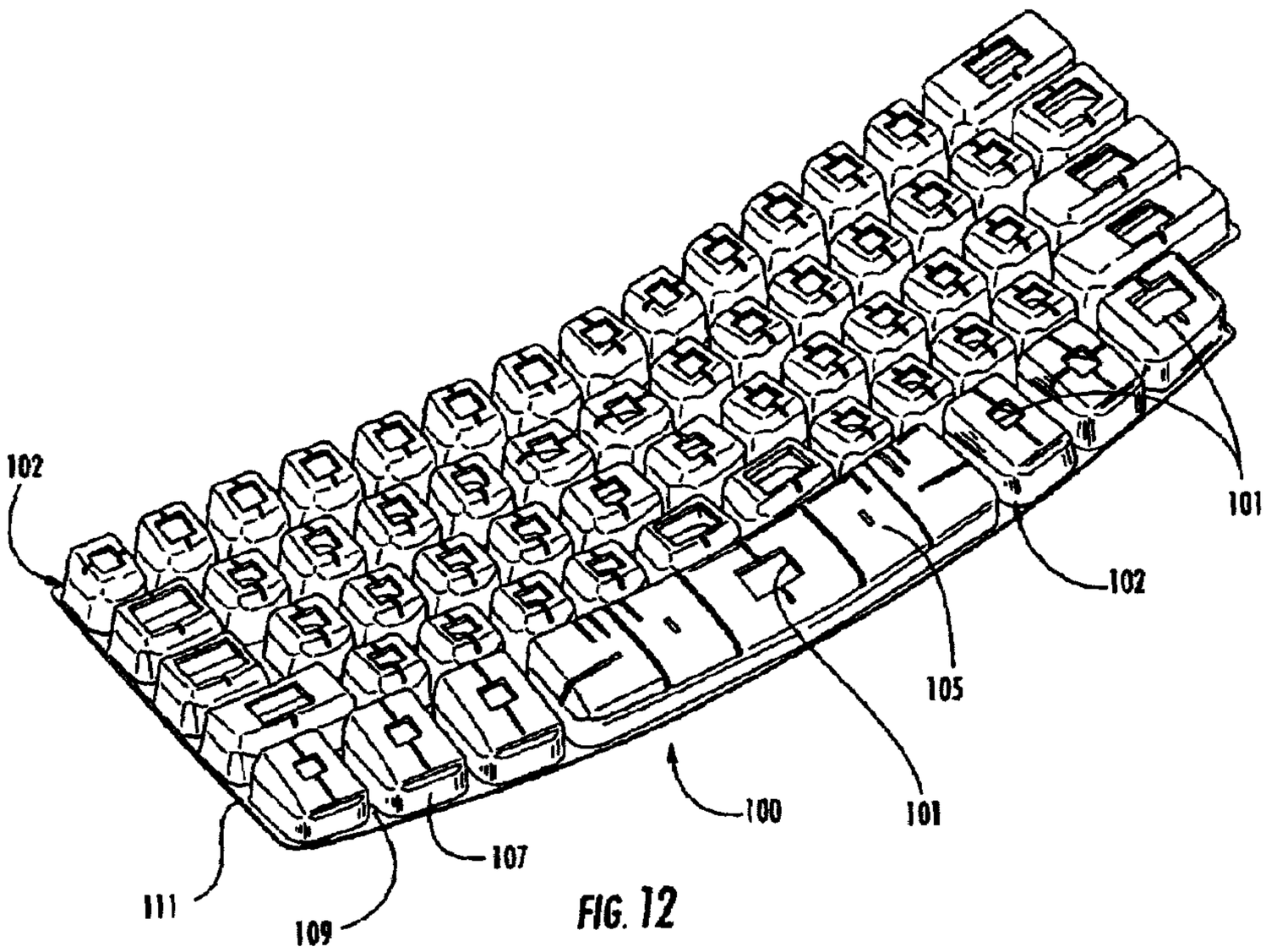


FIG. 12

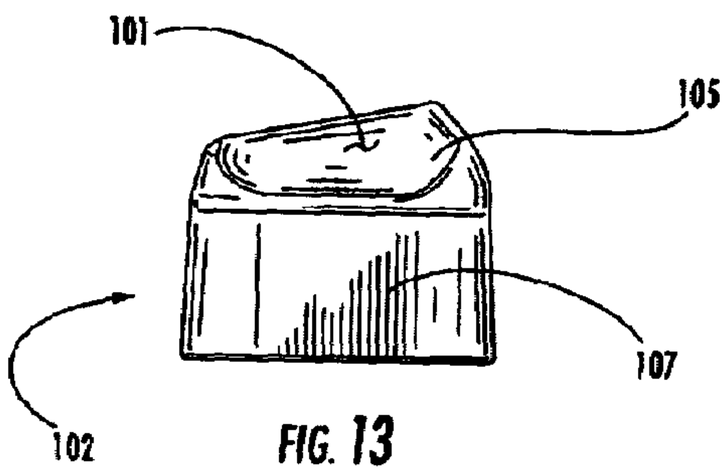


FIG. 13

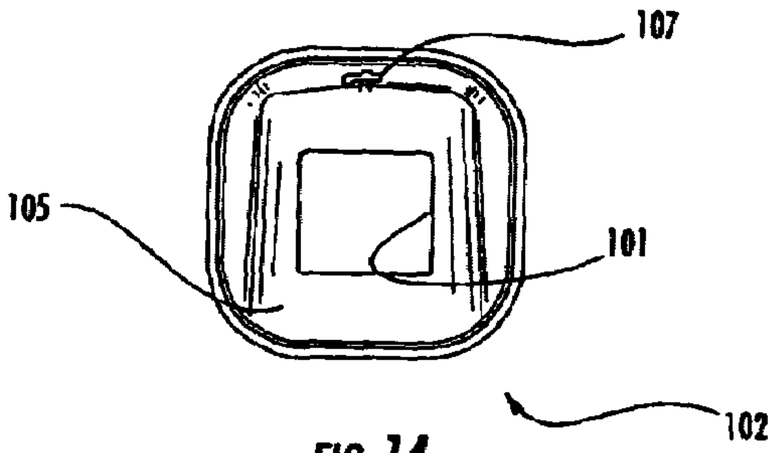


FIG. 14

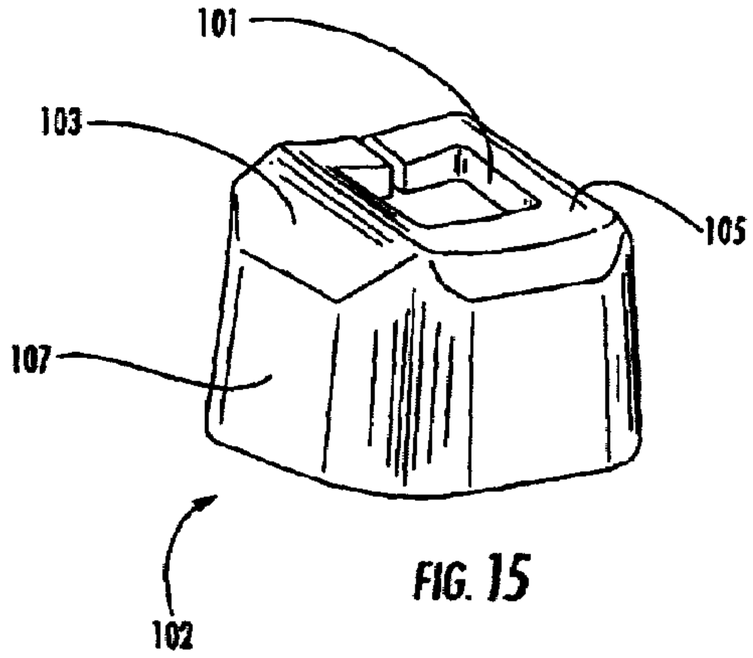


FIG. 15

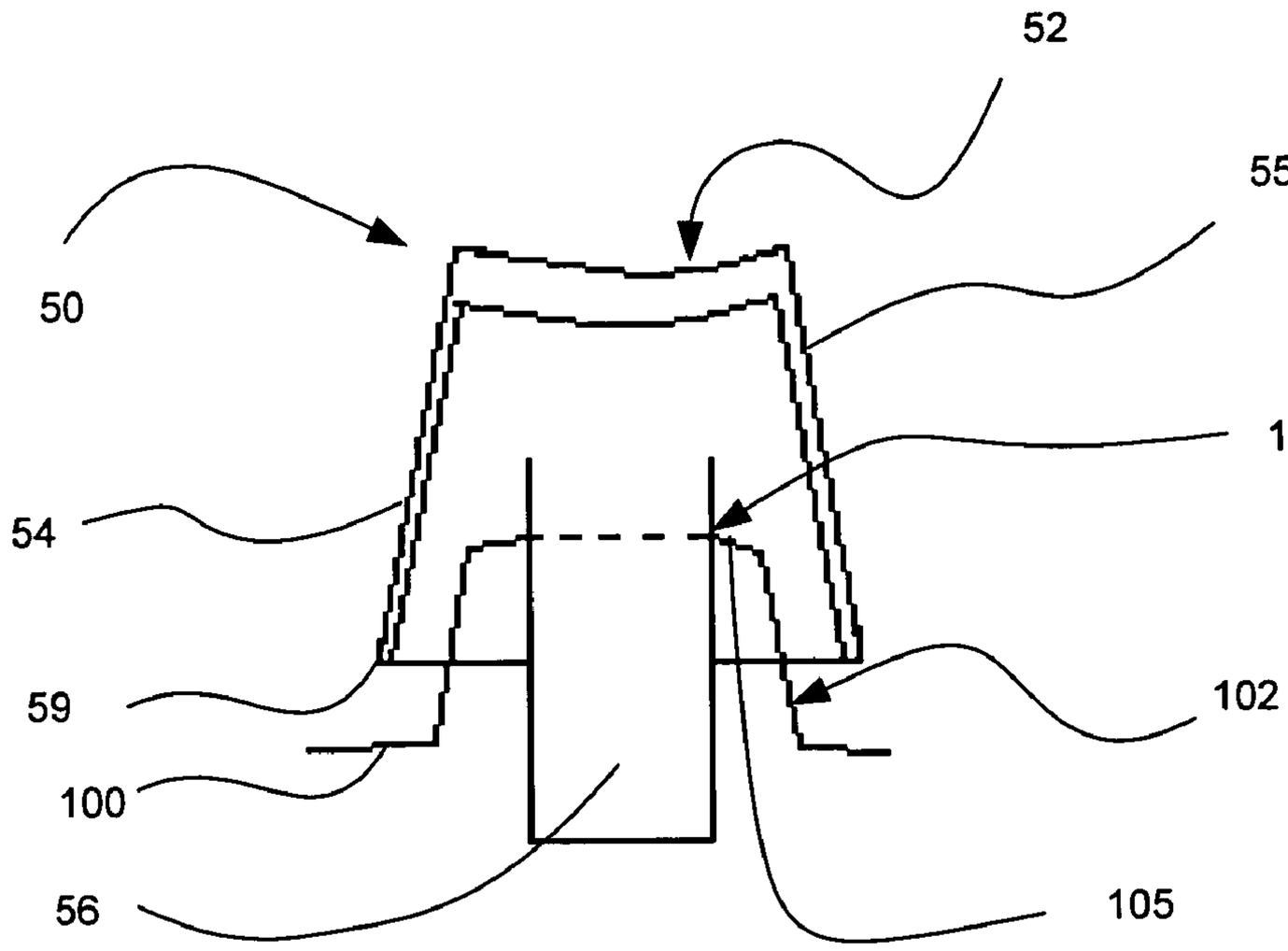


Fig. 16

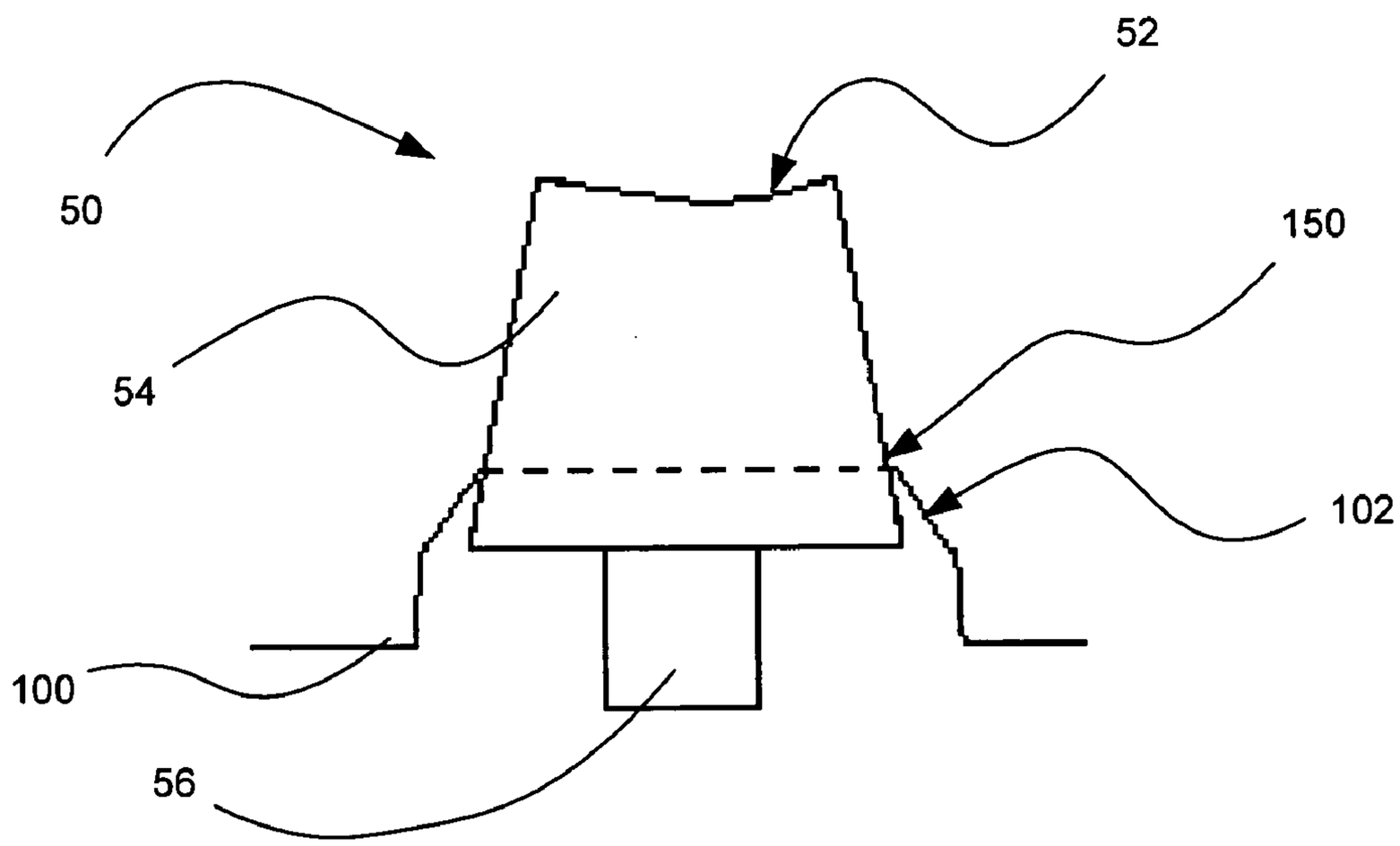


Fig. 17

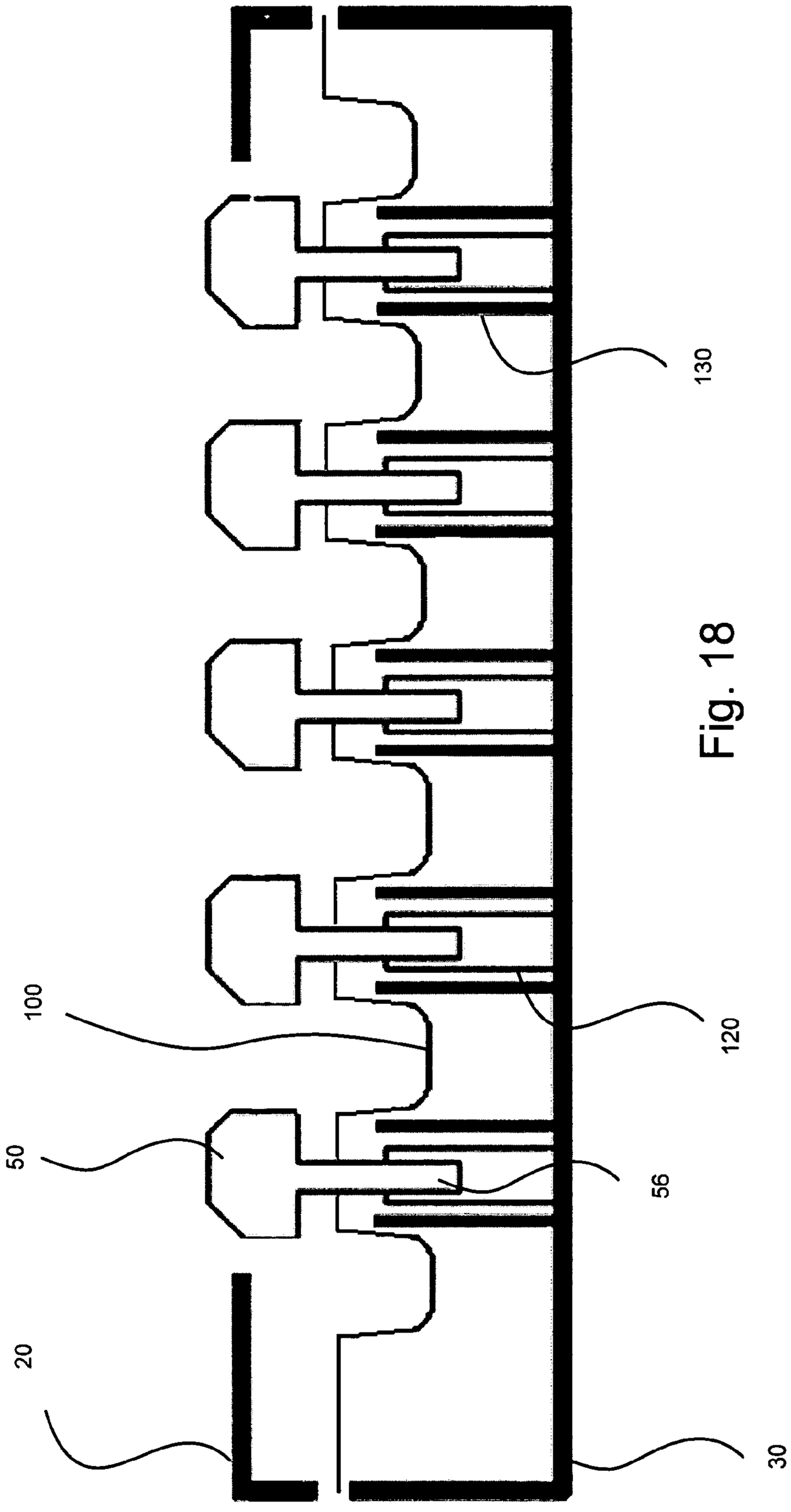


Fig. 18

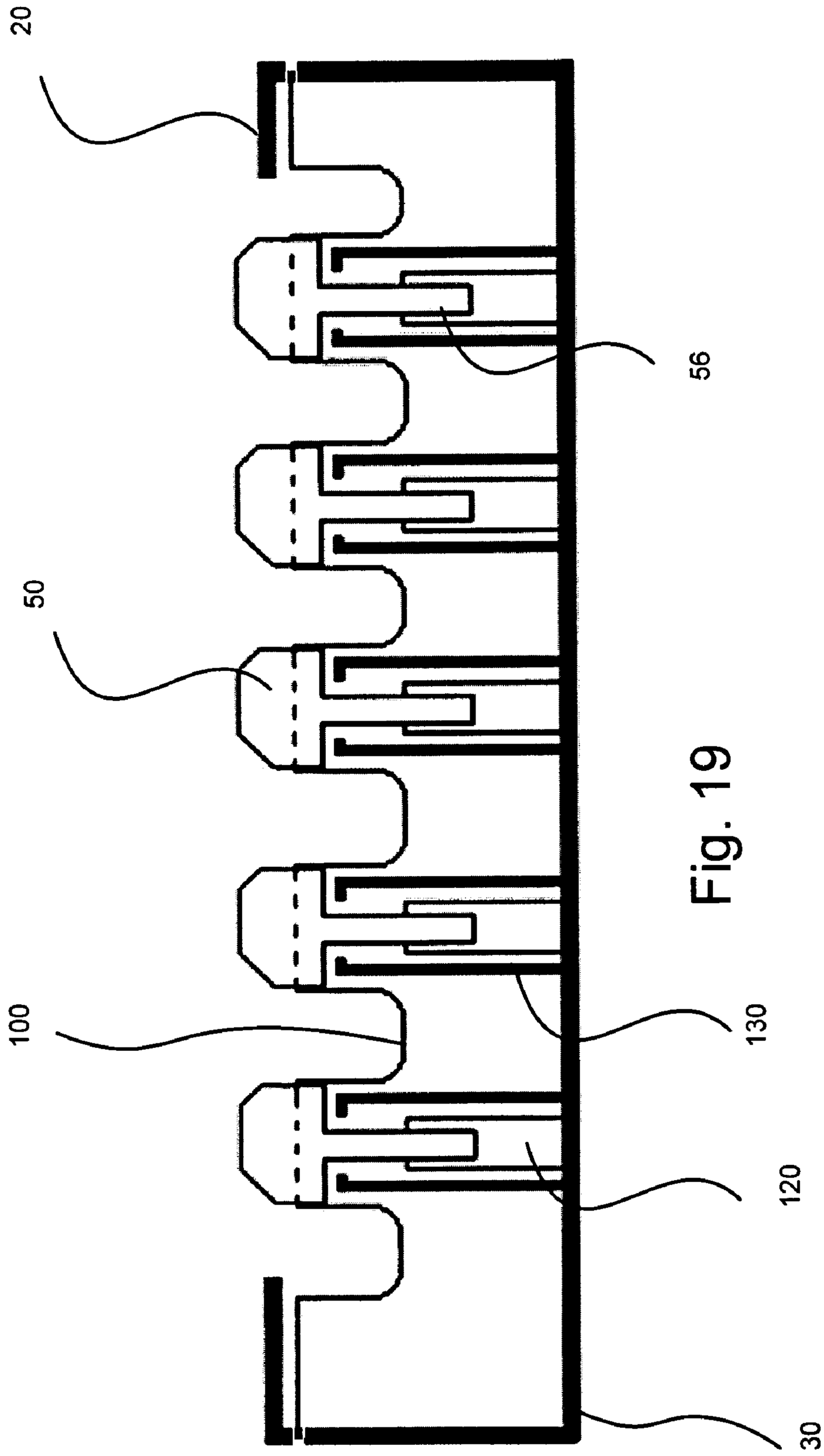


Fig. 19

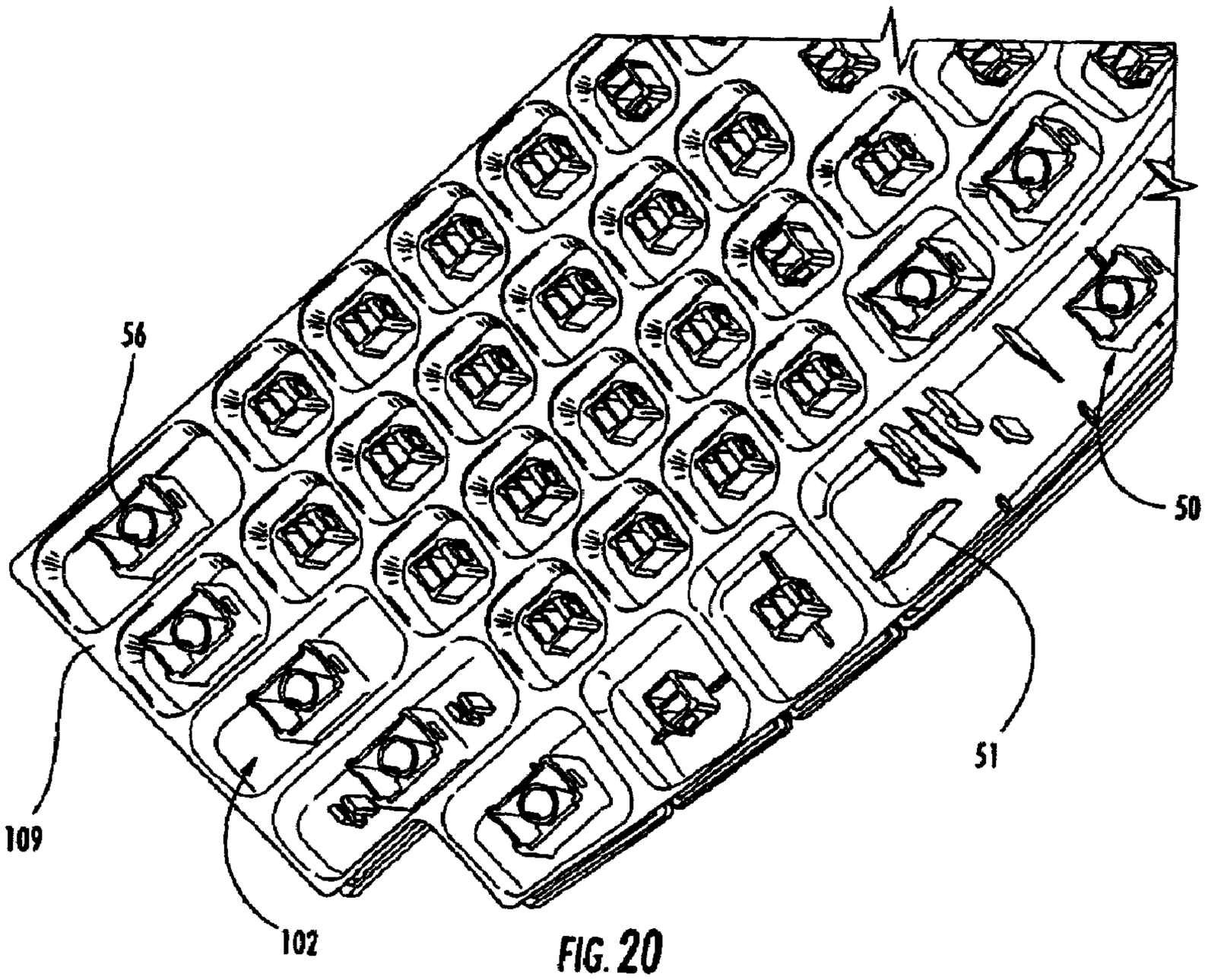


FIG. 20

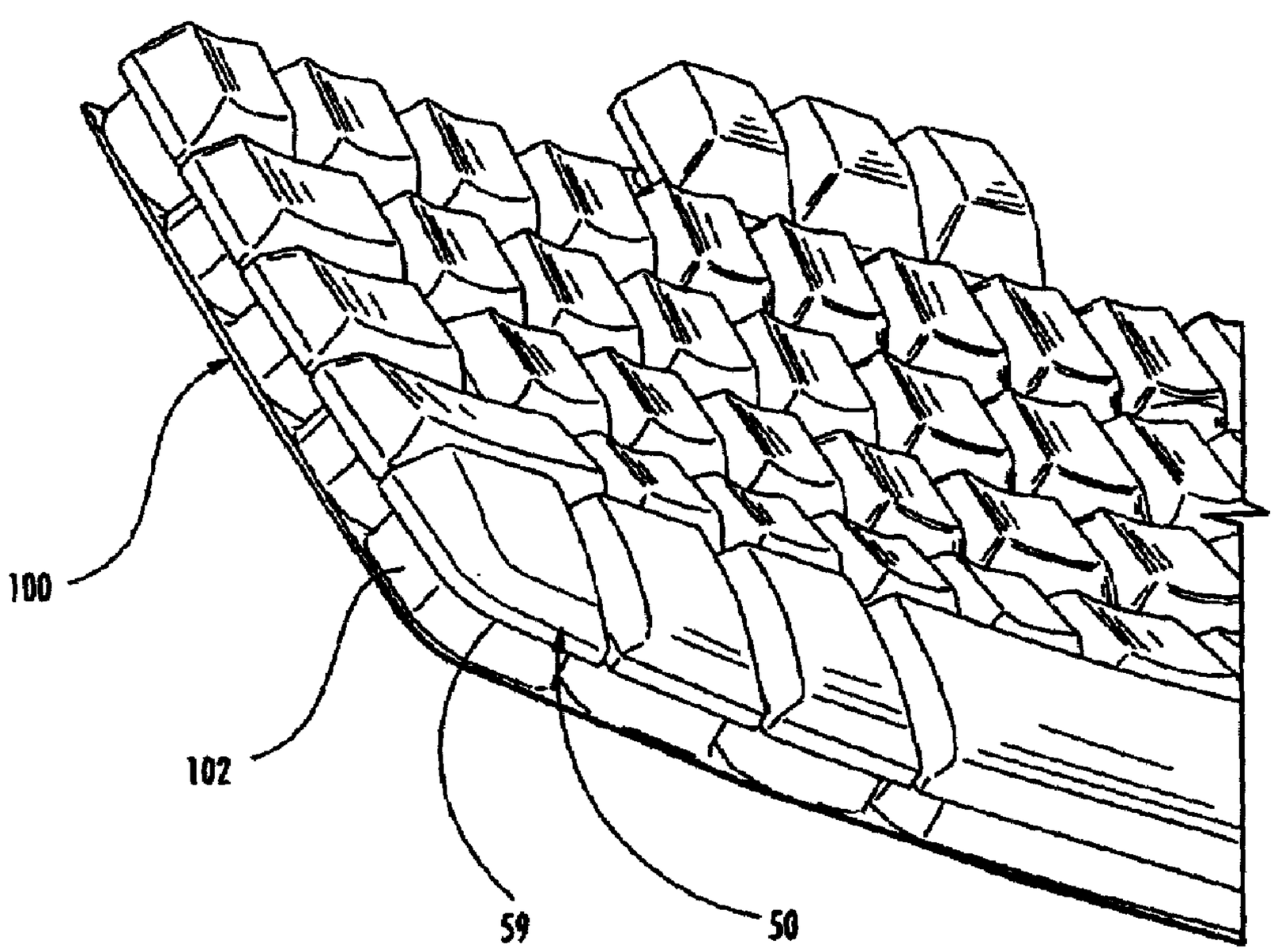


FIG. 21

CLEANABLE KEYBOARD

BACKGROUND

A keyboard is a standard part of a desktop computer. It allows a user to enter data, compose written verbiage and do other useful tasks. The keyboard includes one or more keys with symbols such as the letters A–Z and numbers and punctuation marks. A keyboard may also typically includes additional keys of various sizes such as a space bar, an enter key and the like.

Keyboards typically come in two basic configurations: wired and wireless. While wired keyboards are generally less expensive, wireless keyboards are becoming more popular because they eliminate the need for cords that otherwise clutter up the workspace. Thus, both types of keyboards are found in a variety of settings, depending on what is needed.

One consequence of the proliferation of computers and associated keyboards is that keyboards are now being used in a variety of settings outside of office spaces and other standard work places. This has increased the keyboard's exposure to various environmental factors. For example, users drink various liquids while working with computers and keyboards. On occasion a user will inadvertently spill the liquid and the increase usage along with the variations in locations increases the odds that liquid will be spilt on the keyboard.

As can be appreciated, spilling plain water on a keyboard can be a problem because the water may cause the electrical keyboard circuit to short out and/or corrode. This problem is further exasperated when liquids such as coffee, soft drinks or juices are spilled on the keyboard. Even if the liquid does not short out the circuitry of keyboard or cause corrosion, once the liquid evaporates the keyboard keys are likely to stick because of the residue left behind. Therefore, once a liquid is spilled on the keyboard its useful life is typically substantially reduced.

Another issue with keyboards is that they tend to be unsanitary. Studies have shown that keyboards have high levels of bacteria on the keys. While this has potential health ramifications for a solitary user, the potential spread of bacteria and viruses is a serious issue in facilities such as hospitals where multiple users may use a single keyboard over a period of time. Unfortunately, standard keyboards are poorly suited to cleaning. While it is possible to use a plastic cover over the keyboard, this has a negative impact on the user's ability to use to keyboard and therefore is undesirable.

SUMMARY

A keyboard is provided with a barrier layer that protects the internal components of the keyboard. The barrier layer, which may be silicone, extends between input keys and a sealing surface that forms a perimeter so as to provide a substantially water impermeable pocket surrounding internal components of the keyboard. Thus, internal components of the keyboard are kept safe from liquids in the case of a spill. Depending on the configuration and design of the barrier layer, the keyboard may allow for rinsing under running water.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of example and not limited in the accompanying figures in which like reference numerals indicate similar elements and in which:

FIG. **1** illustrates a plan view of an exemplary embodiment of a keyboard in accordance with an aspect of the present invention.

FIG. **2** illustrates a plan view of a simplified upper housing in accordance with an aspect of the present invention.

FIG. **3** illustrates a bottom view of the upper housing depicted in FIG. **2** in accordance with an aspect of the present invention.

FIG. **4** illustrates a cross-sectional view taken along the line **4**—**4** in FIG. **3** in accordance with an aspect of the present invention.

FIG. **5** illustrates a plan view of an exemplary lower housing portion in accordance with an aspect of the present invention.

FIG. **6** illustrates a bottom view of the embodiment of the lower housing portion depicted in FIG. **5** in accordance with an aspect of the present invention.

FIG. **7** illustrates a cross-sectional view taken along the line **7**—**7** in FIG. **5** in accordance with an aspect of the present invention.

FIG. **8** illustrates a front view of an exemplary key in accordance with an aspect of the present invention.

FIG. **9** illustrates a plan view of the key depicted in FIG. **8** in accordance with an aspect of the present invention.

FIG. **10** illustrates a cross-sectional view taken along the line **10**—**10** in FIG. **9** in accordance with an aspect of the present invention.

FIG. **11** illustrates an elevated bottom view of the key depicted in FIG. **8** in accordance with an aspect of the present invention.

FIG. **12** illustrates an elevated view of an exemplary barrier layer in accordance with an aspect of the present invention.

FIG. **13** illustrates a side view of an upwardly extending projection in accordance with an aspect of the present invention.

FIG. **14** illustrates a plan view of the upwardly extending projection depicted in FIG. **13** in accordance with an aspect of the present invention.

FIG. **15** illustrates an elevated view of the dome portion depicted in FIG. **13** in accordance with an aspect of the present invention.

FIG. **16** illustrates a cross-sectional view of an exemplary embodiment of a key fitted to a barrier layer in accordance with an aspect of the present invention.

FIG. **17** illustrates a cross-sectional view of an alternative exemplary embodiment of a key fitted to a barrier layer in accordance with an aspect of the present invention.

FIG. **18** illustrates a simplified cross-sectional view of an exemplary embodiment of a keyboard in accordance with an aspect of the present invention.

FIG. **19** illustrates a simplified cross-sectional view of an alternative exemplary embodiment of a keyboard in accordance with an aspect of the present invention.

FIG. **20** illustrates elevated bottom view of an exemplary embodiment of a plurality of keys fitted in a barrier layer in accordance with an aspect of the present invention.

FIG. **21** illustrates alternative elevated view of the embodiment depicted in FIG. **20** in accordance with an aspect of the present invention.

DETAILED DESCRIPTION

Keyboards have been used for some time in connection with computers. While other methods of input have been used with some success, the keyboard remains one of the

preferred methods of interfacing with a computer. As can be appreciated, numerous variations regarding the aesthetic appearance of the keyboard is possible. In addition, numerous variations in the number, arrangement and size of various keys are also possible. Unless otherwise noted, this disclosure is not intended to be limiting in this respect.

Turning to FIG. **1**, an exemplary embodiment of a keyboard **10** on a support surface **1** is depicted. The keyboard **10** includes a housing **18** that includes an upper housing potion **20**. Provided in the upper housing portion **20** are a plurality of key openings **40**. As can be appreciated, the shape and number of the openings **40** that are provided is primarily limited by the outer edge **60** of the keyboard **10**.

Positioned within the openings **40** are a plurality of input keys **50**. As can be appreciated, different input keys **50** may have different shapes. It should be noted that groups of input keys **50** may be arranged as desired to provide the desired user experience. In an embodiment, the input keys **50** may be arranged so as to provide a QWERTY keyboard. Additional input keys **50** may be added as desired, the only limitation being the overall size of the keyboard **10** and the individual size of the input keys **50**.

As is known, certain input keys **50** are used more frequently than other input keys **50**. For example, the space bar is used relatively frequently. Therefore, keyboard designers may use the frequency of usage as one variable in deciding how large a particular input key **50** should be, keeping in mind the user's expectations. Regardless of the reasons, some of which are historical, often the various input keys **50** are not uniform in size. It is desirable, but not necessary, that the effort required to press the various input keys **50** be kept fairly uniform, regardless of the size of individual input keys **50**, so as to provide the user with a consistent feedback force whenever the input key **50** is used. This may involve adjusting various factors that will be discussed below through an iterative process so as to provide the desired feedback force.

As noted above, the keyboard **10** may be provided in a variety of shapes and sizes. Other components may be added to the keyboard **10**. For example, as depicted, the keyboard **10** includes a cushion **15** that provides an improved ergonomic aspect to the keyboard **10**. Other components may also be connected to or imbedded into the housing **18** without departing from the scope of this invention.

Turning to FIGS. **2**, **3** and **4**, a simplified embodiment of the upper housing portion **20** is depicted, the upper housing portion **20** including a first surface **21***a*, a second surface **21***b*, the opening **40** and the outer edge **60**. The upper housing portion **20** further includes a first sealing rib **22** and an outer rib **24**. As can be appreciated, the first sealing rib forms an inner perimeter that surrounds the opening **40** and the outer rib **24** forms an outer perimeter around the inner perimeter. As depicted, a first sealing surface **23** is provided on the first sealing rib **22**, the first sealing surface **23** configured to form a perimeter seal around the opening **40**. In addition, a drain hole **25** is depicted as being provided on the first sealing rib **22**. In an embodiment the shape and location of the drain hole may be modified. In an embodiment the drain hole **25** may be positioned closer to the first sealing surface **23** of the first sealing rib **22**. In an embodiment the first sealing rib **22** may be omitted and the first sealing surface **23** may be provided on the second surface **21***b* of the upper housing portion **20**.

Turning to FIGS. **5**, **6** and **7**, an embodiment of a lower housing portion **30** is depicted, the lower housing portion **30** being configured to be fastened to the upper housing portion **20** so as to form part of the housing **18**. As depicted, the lower housing portion **30** includes a second sealing rib **32** with a second sealing surface **33** and a plurality of fastener apertures **36** positioned between the second sealing surface **33** and an outer edge **34**. As depicted, the second sealing surface **33** is configured, so that when the keyboard **10** is assembled, the second sealing surface **33** is aligned with the first sealing surface **23** of the upper housing portion **20**. Thus, the first and second sealing surfaces **23**, **33**, in combination with the barrier layer, discussed below, form a perimeter seal that extends around the opening **40**.

It should be noted that the keyboard **10** may be wireless. In an embodiment, as depicted in FIG. **6**, the lower housing portion **30** may includes a releasable panel **140**. In an embodiment the releasable panel **140** may cover a power source. In an embodiment the releasable panel **140** seals to the lower housing portion **30** when in the installed position so as to aid in protecting the internal components of the keyboard **10** from exposure to liquids.

As depicted, the lower housing portion **30** further includes a third surface **31***a* and a fourth surface **31***b*. In an embodiment, the second sealing rib **32** may be omitted and the second sealing surface **33** may be provided on the third surface **31***a*. It should be noted, however, that it may be advantageous to provide at least one sealing rib on either the upper housing portion **20** or the lower housing portion **30** so as to aid in the sealing of the upper housing portion **20** to the lower housing portion **30** (discussed in great detail below).

As noted, one or more fastener holes **36** may be provided and these fastener holes **36**, if used, may align with associated fastener receiving components (not shown) on the upper housing portion **20**. If provided, it may be beneficial to locate the fasteners holes **36** between the second sealing surface **33** and the outer edge **34** for reasons that will be discussed below.

As depicted, the lower housing portion **30** supports a keyboard circuit **80**. As is known, the keyboard circuits **80** convert displacement of (or forces exerted on) the input key **50** into signals that represent a particular input key **50** being pressed. Numerous methods exist for doing this, including but not limited to, opening or closing an electrical circuit or sensing a change in magnetic fields. As numerous methods are known to persons of skill in the art, no further discussion will be provided and this disclosure is not intended to be limiting in this respect.

FIGS. **8**, **9**, **10** and **11** illustrate an exemplary embodiment of the input key **50**. While numerous materials are possible, in an embodiment the input key **50** may be made of a molded plastic and may include fillers as appropriate. As depicted, the input key **50** includes a key top surface **52**, a plurality of side walls **54** and a support leg **56**. It should be noted that depending on the design of the input key **50**, one or more side walls **54** may be provided. Looking at FIG. **10**, the side wall **54** has a thickness **55** and includes an inner surface **57**. The thickness **55** may vary as needed but preferably the thickness **55** will be similar to a thickness **53** of the key top surface **52** so as to allow for ease of manufacture.

As depicted, the support leg **56** includes a retainer **58**. While not required, the retainer **58** beneficially prevents the input key **50** from being removed from the keyboard **10** once the input key **50** is installed.

As depicted, the side walls **54** end at a key edge **59**. Thus, the side walls **54** act as a protective cover for a portion of the support leg **56**. The benefit of this optional protective covering will be discussed below.

Turning to FIG. **12**, a barrier layer **100** is depicted. While numerous materials and configurations may be used, in an embodiment the barrier layer may be made of silicone and

may be between 0.5 and 1.0 mm thick. Typically silicone is difficult to mold when the wall thickness drops below 0.5 mm. However, in an alternative embodiment, the barrier layer **100** may be made of silicone material having an elastic modulus of less than 5 MPa and using such a material may make it possible to produce a barrier layer **100** with a thickness less than 0.5 mm. As can be appreciated, using such a thin barrier layer **100**, by reducing the amount of material used, tends to reduce the cost and weight of the keyboard and thus makes it more desirable to the user. Relatively speaking, a thinner barrier layer **100** is more flexible than a thicker barrier layer **100** and this flexibility may be helpful in minimizing the impact of the barrier layer **100** on the feedback force experienced by the user. This can have the advantage of making the process of designing the keyboard **10** simpler and less time consuming.

As depicted, the barrier layer **100** includes a plurality of upwardly extending projections **102** with a plurality of key apertures **101** on a top surface **105** of the plurality of upwardly extending projections **102**. The barrier layer **100** also includes a base **109** that includes an outer edge **111**. As depicted, the plurality of projections **102** includes a barrier wall **107**, more of which will be discussed below. As depicted the outer edge **111** is approximate the barrier walls **107** and does not extend outward to any significant degree. In an embodiment, the outer edge **111** may extend outward some additional distance so as to improve the assembly process of keyboard **10**.

Turning to FIGS. **13**, **14** and **15**, an exemplary embodiment of the upwardly extending projection **102** of the barrier layer **100** is depicted. As depicted, the barrier layer includes the barrier wall **107**, the top surface **105** and the key aperture **101**. As further illustrated, the upwardly extending projection **102** also includes an angled wall **103**.

As depicted, the key aperture **101** has a rectangular shape. While other shapes are possible depending on the design of the barrier layer and the interfacing input key **50** (FIGS. **8**–**11**), in an embodiment the key aperture **101** may correspond to the shape of the support leg **56**. In an embodiment, the size of the key aperture **101** may be less than the size of the support leg **56** so that there is an interference fit between the input key **50** and the barrier layer **100**. While somewhat dependent on the shape of the support leg **56** and the shape of the key aperture **101**, in an embodiment the interference fit may range between 0.2 and 0.5 mm. In other words, a perimeter of the portion of the input key **50** that seals against the barrier layer **100** may have dimensions larger than the key aperture **101** in the barrier layer **100**.

Before discussing additional details regarding the upwardly extending projection **102**, FIG. **16** illustrates an embodiment of the input key **50** assembled to the barrier layer **100**. Looking at FIG. **16**, a cross-section of the barrier layer **100** fitted to the input key **50** is illustrated, the cross-section taken along lines similar to the line **10**—**10** in FIG. **9**. As depicted, the support leg **56** is inserted into the key aperture **101** (FIG. **14**). As can be appreciated, the support leg **56** and the barrier layer **100** interface at a junction **150** that is positioned above the key edge **59** but below the key top surface **52**. Thus, liquid being spilled from above the key **100** can cascade over the input key **50** and collect on the base **109** (FIG. **12**). Thus, gravity will help prevent the liquid poured on the keyboard **10** from traveling upward along the barrier wall **107** of the upwardly extending projection **102**. In an embodiment, the drain holes **25**, **35** (FIGS. **4** and **7**) may be configured to allow the liquid to automatically drain away from the keyboard **10** when the keyboard **10** is positioned on the support surface **1** in an intended working position. In an alternative embodiment, the keyboard **10** may be configured to contain the liquid so that it may be safely disposed of by the user. As can be appreciated, while allowing the liquid to drain away under the influence of gravity minimizes the length of time the liquid is in contact with the barrier layer **100**, it may be useful to contain the liquid so as to avoid further spreading of the liquid across the user's work surface.

As can be appreciated, locating the key aperture **101** on the top surface **105** helps prevent the liquid from contacting the interface between the barrier layer **100** and the support leg **56**. However, in the event that liquid does come into contact with the interface between the barrier layer and the support leg **56**, the interference fit between the barrier layer **100** and the support leg **56** may act to prevent water from passing through the junction **150**. Thus, in an embodiment the keyboard **10** may be rinsed under running water. Furthermore, if the barrier layer comprises silicone and the input keys **50** comprise a suitable material such as plastic, then the keyboard **10** may be cleaned with ordinary household cleaners without concern that the keyboard will be damaged, thus enabling ready sanitation of the keyboard **10**. It should be noted that it may be useful to position any symbols on the input keys **50** in a manner that does not allow ordinary household cleaners to cause the symbols to fade or be obscured.

Turning back to FIGS. **13** and **15**, as depicted the top surface **105** is not flat. Furthermore, the upwardly extending projection **102** includes the angled wall **103**. As previously mentioned, it is desirable to provide uniform force feedback to the user so that regardless of which key is pressed, the same approximate feedback force is provided to the user. To aid in providing feedback, the angle of the barrier wall **107** and the angled wall **103** may be modified. For example, the barrier wall **107** may be at, without limitation, an 83.5 or an 87.5 degree angle from horizontal. As can be appreciated, this flexibility allows for greater customizability of the feedback force. As the actual feedback force necessarily various depending on the design of the key, the design of the support leg, the method of mounting the key to the lower housing portion **30**, and the thickness of the barrier layer **100**, the actual shape of the top surface **105**, the angled wall **103** and the barrier wall **107**, if optimization is desired, may be determined through an iterative process. For example, finite element analysis may be used to determine whether a change in angle affects the force feedback provided to the user. In an embodiment, depending on the thickness of the barrier layer **100**, a small change of less than five degrees in the angle of the barrier wall **107** may have a minor impact on the level of feedback force noticed by the user.

As noted above, the barrier layer **100** may be provided in various thicknesses. As can be appreciated, varying the thickness will also affect the feedback force felt by the user. Thus, for a given geometry, increasing the thickness of the barrier layer **100** will generally increase the feedback force. In addition, increasing, from horizontal, the angle of the barrier wall **107** and the angled wall **103** will generally increase the feedback force.

Referring to FIG. **16**, it should be noted that if there is an interference fit between the input key **50** and the barrier layer **100** such that the two are sealably joined, the barrier layer **100** will need to deflect if the input key **50** is to move. Therefore, if the interface between the barrier layer **100** and the support leg **56** is positioned between the key edge **59** and the key top surface **52** (as depicted in FIG. **16**), care should be take to ensure there is sufficient space around the upwardly extending projection **102** (e.g. between the inner

surface **57** and the barrier wall **107**) so as to allow the upwardly extending projection **102** to fold or otherwise deform or deflect in response to the downward movement of the input key **50**.

Turning to FIG. **18**, a simplified cross-section of an exemplary keyboard **10** is illustrated. The barrier layer **100** is depicted interfacing with the support legs **56** below the key edge **59** (FIG. **8**) for ease of illustration. However, as noted above in FIG. **16**, the barrier layer **100** may interface with the support leg **56** between the key edge **59** and the key top surface **52** so as to provide additional protection for the junction **150** between the support leg **56** and the barrier layer **100**.

While depicted as not in contact for ease of illustration and improved comprehension, in practice the upper housing portion **20**, the lower housing portion **30** and the barrier layer **1000** will be compressed together so as to prevent liquids poured on the input keys **50** from above from passing beyond the barrier layer. Thus, in an embodiment the first sealing surface **23** (FIG. **2**), the second sealing surface **33** (FIG. **5**) and the barrier layer **100** may form a substantially liquid impermeable perimeter around the input keys **50** provided in the opening **40**.

The barrier layer **100** also attaches to the input keys **50**. In other words, the barrier layer **100** sealably attaches to the plurality of input keys **50** and sealably mounts to the upper and lower housing portions **20**, **30** so as to provide a keyboard **10** that, in an embodiment, may be rinsed under running water. It should be noted that sealing the upper and lower housing portion **20**, **30** together with the barrier layer **100** has the effect of providing a sealed perimeter around the opening **40** in the upper housing portion **20**. This, in turn creates a substantially liquid impermeable pocket formed by the barrier layer **100**, the input keys **50** and the lower housing portion **30**. Thus, typical electronic components and other common mechanical keyboard components may be position within the pocket with little concern about liquid harming the protected components.

Referring back to FIG. **5**, locating the fastener opening **36** outside of the sealing surfaces **25**, **35** (e.g. the sealed perimeter) helps minimize leak paths into the substantially liquid impermeable pocket formed by the second sealing surface **33**, the barrier layer **100**, the lower housing portion **30** and the input keys **50**. Thus, liquid is unlike to reach the keyboard circuit **80** (FIG. **5**). Other configurations with one or more fasteners positioned inside the substantially liquid impermeable pocket, while less desirable, are also possible. Thus, in an alternative embodiment, the fasteners opening **36** may be positioned in the middle of the sealing surfaces **25**, **35**. In such an embodiment care should be taken to minimize leakage through the fastener opening **36**.

As depicted, the support leg **56** is supported by a compliant element **120** and a well **130**. As can be appreciated, however, in an alternative embodiment the support leg **56** may be configured to fit over a support bar (not shown). Thus, variations in how the support leg **56** interfaces with and is support by the lower housing portion **30** are envisioned as being within the scope of the present invention.

The compliance element **120** may be a variety of designs such as various known spring designs and/or compressible materials. In an embodiment, the compliance element **120** and the barrier layer **100** work to provide a relatively uniform force feedback. As can be appreciated, the feedback force for a given input key **50** may be adjusted by varying properties and/or the shape of either the barrier layer **100** or the compliance element **120** as appropriate. In an embodiment, different input keys **50** may have different configurations of the upwardly extending projection **102** so as to provide a relatively uniform feedback force in response to a user depressing the different input keys **50**.

FIGS. **17** and **19** illustrate an alternative embodiment with the barrier layer **100** interfacing with the side walls **54** of the input key **50**. While similar to the embodiment depicted in FIGS. **16** and **18**, as can be appreciated, such a design directly exposes a junction **150** between the key aperture **101** and the input key **50** to spilled liquids. Therefore, in an embodiment, the fit between the barrier layer **100** and the input key **50** may be relatively tight so as to provide a substantially liquid impermeable junction.

FIGS. **20** and **21** illustrate a plurality of input keys **50** inserted into the barrier layer **100**. As depicted, the interface between the support leg **56** and the barrier layer **100** surrounding the key aperture **101** is protected from direct spills. Therefore, as noted above, such a design allows gravity to channels spilt liquid away from the junction **150** and thus tends to make the design more impermeable to liquids. As can be appreciated, however, if the keyboard **10** is to be configured to be rinsed under running water, the junction between the barrier layer **100** and the input key **50** should be substantially impermeable to liquids. To accomplish this, a greater degree of stack-up (e.g. more of an interference fit) between the barrier layer **100** and the input key **50** may be beneficial.

The present invention has been described in terms of preferred and exemplary embodiments thereof. Numerous other embodiments, modifications and variations within the scope and spirit of the appended claims will occur to persons of ordinary skill in the art from a review of this disclosure.

I claim:

1. A computer keyboard comprising:

a housing, the housing including an upper housing portion and a lower housing portion, wherein the upper housing portion includes a key opening and a first sealing surface, and the lower housing portion includes a second sealing surface;

a keyboard circuit supported by the lower housing portion;

a barrier layer sealably mounted between the first sealing surface of the upper housing portion and the second sealing surface of the lower housing portion, the barrier layer including a key aperture; and

an input key movably mounted to the lower housing portion, the input key being attached to the barrier layer around the key aperture of barrier layer, the input key including a support leg that is configured to interface with the keyboard circuit, whereby the input key, the barrier layer and the lower housing portion form a substantially liquid impermeable pocket around the keyboard circuit.

2. The keyboard of claim **1**, wherein the key aperture is a first key aperture and the input key is a first input key, wherein the barrier layer includes a second key aperture and the keyboard further comprises a second input key movably mounted to the lower housing portion, the second input key being attached to the barrier layer around the second key aperture.

3. The keyboard of claim **1**, wherein the barrier layer includes an upwardly extending projection having a top surface and a barrier wall, wherein the key aperture is located on the top surface.

4. The keyboard of claim **1**, wherein the barrier layer comprises silicone and the key aperture is smaller than a perimeter of the input key at a junction between the input

key and the barrier layer, whereby the barrier layer has an interference fit with the input key.

5. The keyboard of claim **1**, wherein the upper housing portion includes a drain hole located above the first sealing surface, the drain hole configured to enable a user to remove a liquid from the barrier layer.

6. The keyboard of claim **1**, wherein the keyboard includes at least one fastener, the at least one fastener attaching the lower housing portion to the upper housing portion, the at least one fastener located outside a perimeter seal formed by the first sealing surface, the barrier layer and the second sealing surface.

7. The keyboard of claim **1**, wherein displacement of the input key in a downward direction by a user causes the barrier layer to deflect.

8. A keyboard comprising:

a housing including an upper housing portion and a lower housing portion, wherein the upper housing portion includes a first sealing surface and a key opening, the first sealing surface forming a first perimeter around the key opening and wherein the lower housing portion includes a second sealing surface;

a keyboard circuit contained within the housing;

a plurality of key wells supported by the lower housing portion;

a plurality of input keys, the plurality of input keys supported by the plurality of key wells, each of the plurality of keys having a support leg configured to interface with the keyboard circuit; and

a barrier layer having a plurality of key apertures, each key aperture receiving a respective support leg therethrough, the barrier layer fitted to the plurality of support legs and positioned between the first sealing surface and the second sealing surface.

9. The keyboard of claim **8**, wherein the first sealing surface is on a first sealing rib and the second sealing surface is on a second sealing rib, wherein the first and second sealing ribs are configured to mate when the upper housing portion is fastened to the lower housing portion.

10. The keyboard of claim **9**, wherein the upper housing portion includes a first outer rib and the lower housing portion includes a second outer rib, wherein the first and second outer ribs form an outer perimeter and the first perimeter is inside the outer perimeter.

11. The keyboard of claim **10**, wherein the barrier layer includes a plurality of upwardly extending projections having a plurality of top surfaces, wherein the plurality of key apertures are provided on the plurality of top surfaces of the plurality of upwardly extending projections.

12. The keyboard of claim **8**, wherein the barrier layer comprises molded silicone.

13. The keyboard of claim **8**, wherein the dimensions of the plurality of key apertures are smaller than the dimensions of the plurality of support legs so as to provide an interference fit between the barrier layer and the plurality of support legs.

14. A keyboard for use in providing user input, the keyboard comprising:

a housing including an upper housing portion and a lower housing portion, wherein the upper housing portion includes a key opening surrounded by a first sealing surface and further including a first outer edge and wherein the lower housing portion includes a second sealing surface for mating with the first sealing surface and further includes a second outer edge;

a keyboard circuit supported by the lower housing portion;

an input key movably mounted to the lower housing portion, the input key including a support leg, the support leg configured to interface with the keyboard circuit; and

a barrier layer positioned between the first and second sealing surfaces, the barrier layer attached to the support leg of the input key.

15. The keyboard of claim **14**, wherein the first sealing surface is coextensive with the first outer edge.

16. The keyboard of claim **14**, wherein at least a portion of the first sealing surface is inside of the first outer edge.

17. The keyboard of claim **14**, wherein the keyboard further comprises a panel releaseably mounted to the lower housing portion.

18. The keyboard of claim **14**, wherein the barrier layer comprises molded silicone.

19. The keyboard of claim **14**, wherein the barrier layer includes an upwardly extending projection having a top surface, the barrier layer further including a key aperture on the top surface, wherein the input key attaches to the barrier layer around the key aperture.

20. The keyboard of claim **19**, wherein the input key comprises at least one side wall connecting a key edge and a key top surface, the at least one side wall having an inner surface, wherein the key aperture of the barrier layer is positioned between the key edge and the key top surface inside the inner surface of the at least one side wall.

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